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JOURNAL
AND
PHOTOGRAPHIC
ENLARGER
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## NOTICES.

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## NOTES.

**Magic Lantern Journal Annual, 1897-8.** This Annual was published on the 16th ult. Those who have not yet obtained copies will do well to see to this at once, as the publishers inform us that it is in great demand.

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**Life of a Cinematograph Film.**—It has been computed that with ordinary care a cinematographic transparency film can be exhibited about three hundred times.

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**Death of Nelson.**—A cinematographic transparency film has been prepared by Mr. Philipp Wolff, of 9, Southampton Street, to commemorate the anniversary of Trafalgar. These sets have been in such great demand that there has been some little delay in supplying the films, but each order is being taken in rotation.

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**Carbon Lantern Slides.**—Mr. W. Tylar, of Birmingham, has for sale a number of excellent carbon slides of waves, fruit and flower studies, and miscellaneous views.

**Methylated Spirit instead of Kerosene.**—About a fortnight ago a lantern exhibition was about to be given to the St. Clement's Band of Hope, at Kinson. By some foolish mistake the lamp reservoir had been filled with methylated spirit instead of kerosene, and as soon as the lamp was lighted it exploded. A spade was procured, and on it the lantern was carried out of the hall and a bucket of water poured over it. Eventually the lamp was filled with kerosene, and again lighted, and as might have been expected under the circumstances, again exploded. The flames were again put out and the exhibition abandoned.

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**Jubilee Procession at Calcutta.**—For some time past the cinematographic slides of the Jubilee procession, at the Theatre Royal, Calcutta, have been drawing large crowds. On the last day on which they were exhibited the children of the various schools, to the number of about 600, were provided with seats, and it proved a most interesting treat for the children.

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**Holloway Social Union.**—Weekly meetings of this Society are held on Wednesday evenings at 7.30, at Warlter's Road Lecture Hall, Camden Road, Holloway, the following being some of the subjects announced, further particulars of which may be obtained from the Hon. Secs., Mr. Frank How, Oakville, Holly Park, Crouch Hill, and Mr. F. R. Wright, "Dunsmarle," Sunnyside Road, Hornsey Lane. Nov. 3rd, "Dr. Johnson and his Friends," Rev. Bernard J. Snell, M.A., B.Sc. Nov. 10th, Soiree: Juvenile Entertainment. Nov. 17th, "Russia" (illustrated by lantern views), Thos. Lough, M.P. Nov. 24th, Amateur Shakesperian Recitals. Dec. 1st, "Richard Jefferies," Harry Lowerison (Fabian Society). Dec. 8th, MSS. Lecture by the late Mark Wilks. Dec. 15th, Christmas Entertainments: Tableaux Vivants, etc.

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**National Photographic Record Association.**—This association has been formed for collocting records of objects and scenes of interest throughout the British Isles with a view of depositing them in the British Museum, where they can be safely stored and be accessible to the public under proper regulations. Mr. Geo. Scamell, 21, Avenue Road, Highgate, London, hon. secretary, will be glad to hear from photographic workers and those interested.

**Slide-changing Device.**—A patent has been taken out by Mr. Newman, of New York, U.S.A., for "a device for changing slides in an optical lantern." A magazine in which a number of slides are arranged is furnished with a guide-way connecting it with the slide stage, such guide-way being made telescopic. Spring catches bring the slides into the stage at the will of the lecturer, who controls each movement by pressing a ball. The lecturer can be any distance off, all that is necessary being a small tube to reach from him to the lantern. It is claimed that by the use of this apparatus the usual operator can be dispensed with. We have heard this story before, and in this country an inventor produced an appliance by which the lime was also turned by the same means whilst the slide was being changed, but all this, though good in theory, does not in practice take the place of the operator.

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**Acetylene.**—The following notification, dated Oct. 15th, has been published in the *London Gazette* under date Oct. 19th, in substitution for that published in the *Gazette* on Oct. 15th:—"Explosives Act, 1875. Notice is hereby given that, after the expiration of forty days from the date hereof, it is proposed to submit to Her Majesty in Council, in pursuance of the abovementioned Act, the draft of an Order in Council declaring acetylene, when liquid or when subject to a certain atmospheric pressure, and when not specially exempted by an order of the Secretary of State, to be an explosive within the meaning of 'the Explosives Act, 1875,' and prohibiting its being manufactured, imported, kept, conveyed, or sold."

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**Sale of a Lantern Business.** — Messrs. Searle and Anderson, of Luton, have disposed of their lantern apparatus and slide business to Mr. Frank Knight, who has had the entire management of the business for a long time past.

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**Uninflammable Celluloid.** — Those who have been scared with the absurd thought that celluloid films are dangerous to use as they are very inflammable can console themselves with the report that they can be made uninflammable as follows:—Ordinary celluloid is dissolved in acetone and a solution of magnesium chloride in alcohol added.

## *Lecturers and Lanternists.*

### American Enterprise.

IN this country it is the custom, for the most part, of lecturers of note to negotiate their own lecturing engagements; and when they are in the habit of employing the lantern to illustrate their remarks, either engage their own operator or call in the aid of a dealer in apparatus to supply apparatus, slides, and operator, in part or in whole. The lecturer it will thus be seen "bosses the show," and the operator is merely a subservient and silent adjunct, while the whole of the credit goes to the former.

In the United States matters are taking quite a different turn, and the lanternist is in many cases taking his fair share of credit in connection with illustrated lectures.

While he was on a visit to this country a short time ago, we had a long talk with Mr. Gould W. Hart, of 849, Monroe Street, Brooklyn, U.S.A., who may be considered as the pioneer in the matter of taking lecturers in hand. Mr. Hart, it may be said, is an up-to-date lanternist in every sense of the word; and is also a strong believer in printers' ink in the form of pamphlets, etc., which begin with an announcement after the following style:—

"The attention of Pastors, Sunday School Superintendents, Teachers, Entertainment Committees, Societies, and others is called to the partial List of Men and Topics herewith presented.

"Many of the men are well known and have been long in the lecture field. The topics cover a wide range, and all of them are illustrated with beautiful lantern pictures.

"A lecture to be popular must be illustrated; and it is wise to employ the best apparatus and manipulation in order that the illustrations may be presented to the public in all their beauty. This I can do, and I am also prepared to bring you in contact with these people, and to aid you in finding a speaker and topic suitable for your purpose."

Among the list of lecturers mentioned, or we might say controlled, we find such names as Alexander Black, James Bowie, P. S. Curtiss, William Danmar, Rev. H. A. Monroe, D.D., Arthur Collins Maclay, Dr. George W. Powell, Alice D. le Plungeon, Cyrus H. Taylor, William E. Platt, Gould H. Hart, Prof. W. C. Peckham, Prof. Chas. Sprague Smith, and many other well-known popular lecturers. Each lecturer has, of course, several subjects upon which he or she is prepared to lecture, and these are set out with much detail in the pamphlets, from one of which, headed

**colour and polarised light,**

we shall quote: "Modes of obtaining colour, dispersion, absorption, and interference; the glories of Nature's robe; the setting sun and the rainbow; the qualities of colour; polarisation, its cause, modes, effects; most beautiful objects in polarised light; crystals glowing with exquisite tints formed on the screen before the eye; the most gorgeous effects science can produce; it is an evening in an enchanted land."

When slides are sent out by Mr. Hart, he always places at one end of the box of slides a card the size of a lantern slide bearing the following notice:—

NOTICE.

**The Lantern Operator will find the first Slide to be used in the end of the box.**

Title of Lecture

............................................................

Property of

............................................................

A special point is made of supplying printed pamphlets to each lecturer on the list for his own use, commencing with the title of the subject, and then the name of the lecturer, together with a synopsis of the lecture itself. The fact of the management of the lantern being in the hands of ............ is not omitted, and testimonials and extracts from daily papers are by no means neglected in these pamphlets.

The subject of the lantern, or stereopticon as it is usually termed in America, is brought prominently before those likely to be interested in the following neat and impressive manner:—

**A word for the Stereopticon.**

"The constantly increasing uses of the stereopticon in our churches, schools, colleges, public halls, and even private houses, is manifest to all, and its popularity is well deserved, for it enables the speaker to present not an imaginary representation, but a picture of the thing or place itself.

It is said that a nation's prosperity depends largely upon a cheap, rapid and safe mode of transportation. May it not be said that it depends more largely upon a cheap, rapid and safe means of spreading knowledge among the masses.

Does not the stereopticon do this?

But just as the locomotive requires a skilled hand at the throttle to obtain from it the safest and best results, so the stereopticon requires careful and skilful manipulation by one who is an expert, who understands its principles and capabilities.

Such a man will produce results which will raise the stereopticon to a higher level and broaden its usefulness.

I have only men of known ability in my employ. My apparatus is of the finest construction. No expense having been spared in the purchase of superior jets, dissolving keys, lenses, etc.

Much of my apparatus as well as methods of use are original with myself and have never failed to give perfect satisfaction.

It is my ambition to make the name of HART synonymous with all that is best in the line of illustrating with the stereopticon.

### To Parsons.

A really good stereopticon exhibition is one of the finest, most enjoyable entertainments that can be given. It will have a strong tendency to weaken the desire for low theatrical performances and increase taste for more healthful amusement.

The mission of the stereopticon is great, and must come to the front. Will you not open the door to its greater influence among your people?

I can help you to place valuable, interesting and instructive information before your people.

To give innocent entertainment to the youth of your church.

To attract children to your Sunday school, by showing them beautiful pictures.

To raise money for church, Sunday school, or charitable work.

I am prepared to do anything or everything in the line of illustrating with the stereopticon, in the most careful, prompt, and satisfactory manner, and at reasonable prices.

If you desire I can furnish complete outfit, comprising choice of a large number of topics, illustrated and described by various well-known speakers, stereopticon with operator, printed show cards, circulars and tickets.

If you have a lecture and illustrations of your own, I will furnish and operate the stereopticon.

If you have any topic upon which you yourself would like to lecture, and have no illustrations, I can obtain them for you, or if you have photographs of your own, I am prepared to make from them lantern slides.

If you contemplate any work in this line, I shall be pleased to correspond with you, and give you any advice or information in my possession, whether you wish to employ me or not.

### Church Fairs.

If your church intends to hold a fair during the coming fall or winter, I can help you to raise money.

1st. By the use of my stereopticon in one of the smaller rooms in which I can give a number of short exhibitions of beautiful pictures (it may be called an art gallery) to which a small admission may be charged.

2nd. By the use of my phonograph with a select collection of records.

I will work either of the above on a percentage or at so much per evening.

3rd. I will make a photograph of your church and place a copy in your hands, from which orders may be received at the fair. A good margin of profit allowed on each one sold.

Calcium lights furnished for tableaux, Christmas trees, etc. Stereopticons operated, lectures furnished. Lantern slides made.

Only honest conscientious work done.

If your church intends to have a fair or illustrated entertainment, and you look with favour upon any of the above plans, I shall be glad to hear from you."

From quite a small beginning, working solely by himself, this energetic gentleman has gradually worked his way to the front until he now controls several departments, at the head of each is placed an experienced man, and in this manner business has extended from that of operator to what might be termed a lecturer's agency.

Symptoms of the desirability of such an agency for lantern lecturers are not wanting in this country, and we heard a few days ago from a prominent Liverpool firm which deals in lanterns, that they had on one or two occasions been asked by lecturers if they could place their names and lectures on a list with a view of booking engagements. A fine field can in the manner mentioned be opened out in this country by some energetic firm, who will supply operators and apparatus of the very best, and in fact take in hand the scientific lecturer, who as often as not cannot be termed a good business man.

## *Exciting Occurrence in a Baildon Chapel.*

THE exciting occurrence in a Baildon Chapel, to which such prominence was given in many of the leading newspapers, furnishes an apt commentary on the avidity with which the daily press seizes upon the exciting with little regard to accuracy. If it had not been for the Paris disaster it is unlikely that this little incident would have attracted any attention outside the locality in which it took place. The whole affair was grossly exaggerated, and the *Bradford Observer* is the only paper which contained a correct paragraph on the subject. It appears that Messrs. Bentley and Rigg, the operators on this occasion, were working a cinematograph without an alum tank, and unfortunately they had placed their apparatus in such a position that the heat rays converged upon the very centre of their film. They admit that as a consequence of this their disc was imperfectly illuminated, but did not attribute this to the position of the apparatus. They had shown about nine pictures, when one of the films slipped in the machine, and as the operator was attending to it with the

**full blaze of light**

upon the film, it fired. Instead of allowing the fire to burn out, as it would have done in his type of machine, at the expense of the loss of one picture only, he turned his film back towards his film box, his object being to save the contents of the receptacle which contained his used films. By this means he conducted the flame to the upper part of the film, which fell into the receptacle below, fired the remainder of the films, and caused a large flame to shoot up for a few seconds. There was, of course, a panic, and the people made for the doors, but Mr. Bentley, who with commendable presence of mind had turned off the gas at his cylinders, jumped upon a form and shouted to the people that all was right. The panic was speedily allayed and nobody was hurt. Neither of the operators sustained the slightest injury, and the little girl who was reported to be so severely burned had merely a spark burn upon her face and followed her employment next day. The reports which the papers circulated caused great annoyance to the people whose names were mentioned, as it subjected them to much ridicule on the part of their fellow work-people. It must be noted that there was absolutely no drapery of any kind round the apparatus; there was no explosion, or, in fact, anything that was in the remotest degree connected with the illuminant; there was no damage to the chapel, nor to anything except the films. The danger, of course, arose from the state of panic into which the crowded audience was thrown.

It will be of interest to some of our readers to know that from actual experiments conducted on the following day with highest power limelight, it was found that when the film was in the centre of the converged light rays and no alum tank was used, it took only six or seven seconds to fire the film. When the film was pushed two or three inches nearer the condenser, and in such position that the disc was correctly illuminated on the screen, twenty minutes' exposure to the same light failed to fire it, though it was much scorched. (This does not apply to electric light.)

When water tanks are used there is practically no danger of firing the film, but tanks leak very soon, and they stop a great deal of light, and on these accounts are discarded by the majority of operators. If a film should fire in a machine which is closed in, it can only destroy one inch of the film, and if it be allowed to burn itself out no damage would be done; but in machines of open construction the flame can, of course, travel. Although it is of importance that all cinematograph operators should thoroughly understand their instruments and be acquainted with the *modus operandi*, it is unfortunate that "penny-a-liners" should be allowed to give such misleading reports about explosions, severe burns, drapery in flames, etc., etc., as were so eagerly published in connection with this regrettable incident.

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## *Spurge's Gas Compressing Works.*

MR. JAMES B. SPURGE, who has long been an authority in connection with the subject of the manufacture and compression of gases, has opened new works at 45, Greek Street, London, W., where he has laid down a most complete and perfect plant. A special point is made of the thorough testing of cylinders ere they are filled with gas.

The cylinder having passed the annealing stage and stamped accordingly, is filled with water and attached to an hydraulic pump of special design, the water is forced in till the pressure reaches $1\frac{1}{4}$ tons (2,800 lbs.) per square inch; gauges in duplicate being provided to ensure accuracy. It is next beaten with a metal mallet to develop any inherent weakness, which, if present, would be shown by a fall on the gauges. The pressure is next increased to $1\frac{1}{2}$ tons (3,600 lbs.); the expansion is noted by the amount of water required to effect this. The stretch or permanent set of the walls is indicated by permitting the water to return into the pump, consequently if there has been any increase of capacity or enlargement of the cylinder, all of the water forced in would not return, and such being the case the cylinder would be condemned.

When proved satisfactory it is punch-marked in such a way as to enable one reading the entry at the works to know all about it before charging with gas. The inside of the cylinder is also examined by means of a small electric lamp which is inserted when the valve is off.

The same amount of care is taken when charging with gas, and two separate methods are employed, one to test the other. The safety valve is set at a certain pressure and locked so that it is impossible for it to be **altered by chance,** then two pressure gauges indicate the amount of compression, and lastly, the gas is also weighed. Each cylinder while being filled hangs on a delicate scale, a weight equivalent to the amount of gas to be compressed being adjusted. Thus, when the cylinder has received its charge the scale operates and the gauges indicate the corresponding pressure. In case of excess the safety valve opens and relieves the surplus.

At the time of our visit, valves were being turned on a powerful lathe driven by steam, and by means of the turret system with which it is fitted, the work seemed particularly simple, yet each valve was turned and finished with mathematical accuracy one to the other.

Being the inventor of the well-known Duplex regulator, Mr. Spurge possesses the right to manufacture them, and will shortly have many ready for use. Mr. Spurge has also a large connection among dentists and others for liquid nitrous oxide gas.

———:o:———

Eastman Photographic Exhibition.—From October 27th to November 16th, the Eastman Photographic Exhibition at the New Gallery, 121a, Regent Street, W., will remain open daily from 10 a.m. to 7 p.m., and also on Monday and Thursday evenings from 8 to 10. Four galleries have been arranged for the display of apparatus and photographs taken in all parts of the world.

# Prominent Men in the Lantern World.

## No. XIII.—Mr. FREDERICK YORK.

It may safely be said that among lanternists there are none but who have heard of York's lantern slides. The headquarters of this firm, which was founded by the subject of our sketch, are situated at 67, Lancaster Road, Notting Hill, W. Like many other prominent men, Mr. York was by his relatives intended for quite a different line of business.

His birthplace and old home is Bridgwater, and the record of his birth appears in the year 1823. After the usual years of schooling it was decided to make a lawyer of him, but he soon found that his tastes did not lie in this direction, so he was in 1839 apprenticed to a chemist at Bristol, and it was this step which was the means of his becoming interested in photography. Photogenic paper, which was mostly used for taking impressions of leaves, ferns, etc., was sold at the chemists, and Mr. York, in handling it, had his interest aroused to such an extent that he began the then system of photographic procedure, and in due course became particularly efficient at taking pictures. Fortunately or unfortunately for his future career, his health became very delicate, and in 1853 he was advised by his doctor to go to the Cape of Good Hope, where he rapidly improved and took up the subject of photography as a hobby, but this hobby resulted in his having a large photographic business a couple of years later. In these days photographic materials and chemicals were not procurable in that part of the world, and it was then that Mr. York's knowledge of chemistry came to his aid, and we learn of his having to rectify ether, manufacture his own pyroxaline, convert Mexican silver dollars into nitrate of silver, etc., in order to replenish his stock.

After spending several years in this manner, he, feeling that all his strength had returned, felt a hankering after old England, and after weighing the matter *pro* and *con* disposed of his business and returned to this country in 1861, and in the following year commenced outdoor photography in London, and took several thousands of negatives of places of interest; from these he made lantern slides. The demand for slides became greater and greater, assistants had to be obtained, and so the well-known house of business started. As it grew other premises became necessary, and Mr. York erected a slide factory in his native town, the work from which was sent to the London offices daily. Work of all descriptions was turned out with great promptitude, and promptness has been associated with his firm ever since its commencement. The high quality of York's slides are too well-known to need comment.

At the offices and works at Lancaster Road, where the commercial portion of the business is managed, very convenient arrangements are made for taking life model sets, and a species of stage is kept for the purpose. Here is stocked scenery and properties of various descriptions, and the wardrobe room contains dresses enough to make one think it had some connection with one of the London theatres.

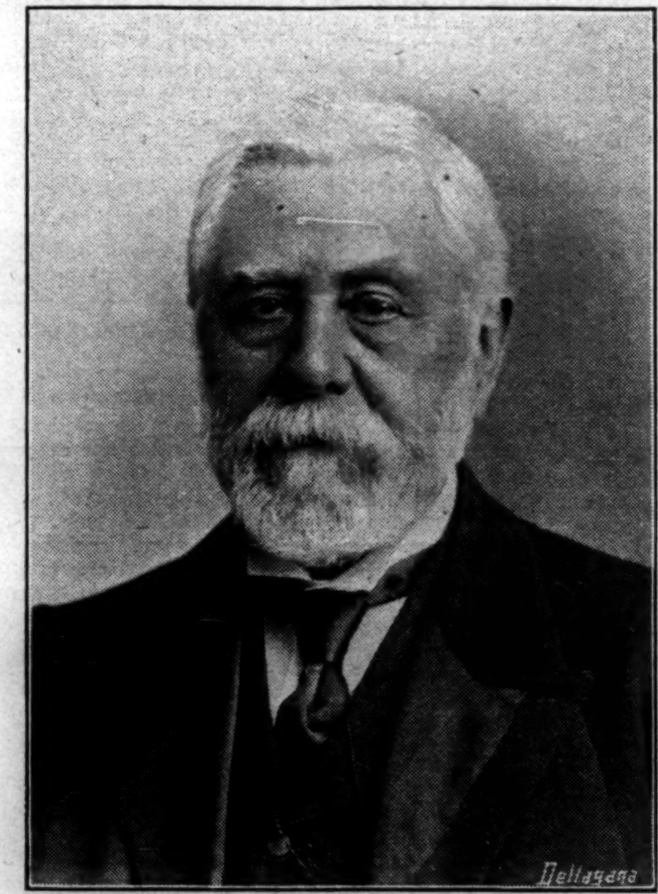

*Photo by* *W. H. Prestwich, Tottenham.*

Of late years the firm has been changed from Frederick York to that of York and Son, and much of the business transactions fall upon the broad shoulders of Mr. William York.

We asked Mr. York if he had any idea as to the number of slides which had been made and published by his firm. "Taking," he said, "from 1870 to the commencement of the present year the sales would represent the following proportions. The slides if placed in a continuous line would reach from London to Manchester, 184 miles; their gross weight would be 93 tons, equal to twelve railway truck loads, and if placed one on each other would form a column 20,846 feet high."

The question is—What becomes of these? Had they been biscuits we could readily understand, but glass is not a digestible article.

Mr. York's kind deeds are well known to those whom he has assisted from time to time. Of this outsiders know little or nothing, for in this matter he adheres strictly to the advice contained in Matthew vi., 1.

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## *The Lanternist's Practical Cyclopædia.*—No. XIII.*

**By CHARLES E. RENDLE.**

HYDROGEN GAS.—The lightest of all known substances, the air we breathe being nearly 14½ times heavier than hydrogen. Hydrogen is the chief constituent of water. It is found in most all animal and vegetable substances, and constitutes 1-9th of the water of the globe. The ordinary method of preparing hydrogen gas in a small way is from zinc and sulphuric acid. It is advisable to granulate the zinc, which is easily done by melting it in a ladle, and pouring it whilst in liquid state from a height into a vessel containing water, the object of this being to give a greater surface for the acid to work upon. Next place the zinc in a two-necked chemical bottle and well cover it with water. If the zinc be but partly covered, the acid will no doubt act upon the exposed parts with much violence, causing accidents, havoc, and damage. Into one of the necks, a thistled-top glass tube must be fixed, the bottom of which must nearly touch the bottom of bottle. From the second neck a delivery tube is arranged, so that as the gas is generated it is carried off by this delivery tube to the collecting trough—which is a trough of water—where it is purified, after which it passes into the cylinder, bag, or other receptacle for storage. Assuming the apparatus to be in readiness, the acid must be poured into the funnel of tube in very small quantities at the time, when the gas at once will begin to flow and pass from the generating bottle to the tank, and from the tank to the receiver. It is most important that the acid be added very gradually for more reasons than one. Before the acid is applied, the bottle is partly filled with air, and this must be dispersed slowly. Hydrogen mixed with air is highly explosive, and too much care cannot be exercised in making it. The novice is also cautioned against bringing a light in contact with the mixture. It is further advised to test the gas before using it in quantity. This is done by collecting a little in a test tube, when if the gas be pure it should burn with a soft blue flame. A lighted taper will also be extinguished by plunging it into the gas, and again rekindle into flame on withdrawing it. Amateurs are advised not to attempt the compression of gases.—*See* also Compressed Gases.

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**Illuminants.**—Substances and elements with power to illuminate. The sources of artificial illuminants or artificial light may be described as candles, burning oil in lamps, coal gas, arc and incandescent electrical lamps. Each and all of these are illuminants. Commencing with candles, then oil, then gas, it is found upon experiment that they depend for their lighting and heating properties upon the elements carbon and hydrogen, which by their decomposition emit light. The electric arc lamp is the light of the highest intensity, whilst the light, from the composition of light-giving waxes and fats, are lights of the poorest power. Many articles in this series which apply to the subject, such as electric lights, candle-power, gases, etc., etc., may be perused with interest. Discussion has been going on for many years past as to the best illuminants for lantern work; the most popular has been the oxy-hydrogen, or mixed gases. The electric light is the *par excellence* of illuminants, but like that of the mixed gases it does not come within the province of all lanternists. It is hoped in the near future a light for this purpose will be decided upon of the required intensity and absolutely non-dangerous to use.

**Illusion.**—Fallacy, deceptive in appearance, etc. It is somewhat difficult to define the term in consequence of its seeming complexity. We know what an illusion is, but cannot always grasp its truth, or more correctly speaking, its falsehood. Optical illusions and mechanical illusions sometimes agree and sometimes differ, and it is not essential in all cases to have mechanical appliances or instruments to prove that an optical illusion is an illusion. As an amusing example:—Place the tip of one of the forefingers on the tip of the nose, fixing the sight on the finger. Next open and shut first one eye then the other simultaneously, and so repeat a few times, and the illusory effect of the finger moving to and fro is plainly marked. The optical lantern is splendidly adapted for demonstrating illusions, which, without its aid, would be complicated, and often impracticable. A bi-unial or triple lantern is absolutely the best optimechanical illusive instrument obtainable.

**Impromptu Speaking.**—The faculty of speaking without preparation. To address the public off-hand, etc. To lanternists impromptu speaking is a valuable accomplishment, and should be cultivated, for it must be borne in mind that audiences object being read to; moreover, it is a custom which often prevents the aspirant from becoming popular.

**Incandescent Lamp.**—*See* Electric Lamps.

**Incandescent Light.**—Both solids and fluids that are not converted into vapour at a less elevated temperature, become perceptibly luminous when heated to 800 degrees in the dark, or to about 1000 degrees in daylight. At first a glow of red light appears, which slowly turns to whiteness as the temperature increases. Combustible solids are said to be in a state of ignition when cherry red hot, and incandescent when at a white heat. The incandescent gas light introduced some time ago for illuminating, and as a light for the lantern, consists of a chemically treated gauze cone, or mantle, which is placed over the flame, and at once becomes incandescent, giving a light of great power and whiteness. These incandescent gas mantles are thus prepared:—Lengths of stockinette are soaked in a saturated solution of thorium 98 parts and cerium 2 parts. The meshy material is then squeezed of the solution and cut in lengths; one end of each is then tied with asbestos string. They are next stretched over moulds—four or six times larger than the finished mantle—held by a wire and burnt from the top; during the burning process, they shrink to the size they take commercially. These mantles are now most delicate and fragile, and are dipped into collodion and allowed to dry; this gives them as it were a body or support, that they may be packed or transferred to the user, who in turn places them on a Bunsen burner, again lighting from the top, which burns away the skin formed by the gun-cotton solution; an incandescent light is the result.

**Incombustible Packing.**—Substances that resist heat, or that will not burn; among their uses may be mentioned the packing for saturators, such as asbestos.

**India-rubber, or Caoutchouc.**—An elastic impermeable substance found in the sap of many tropical plants. When exposed to cold it becomes hard and rigid, but regains its elasticity by gradual warmth. Vulcanised india-rubber is rendered more elastic and less porous by the vulcanisation process. When mixed with a large proportion of sulphur, and heated up to 400 degrees, it is converted into ebonite, which becomes highly electrified by friction, hence it is considered one of the best known insulators for electrical work.

**Induction Coil.**—An application of the principles of electric induction, for the purpose of obtaining electricity of high tension and power. Changes effected merely by proximity to an excited body are called cases of the induction of electricity, and the electricity is said to be induced.

**Inertia.**—That property or absence of it, by virtue of which matter continues in a state of rest, or uniform motion in the straight line, unless acted upon by impressed forces.

**Installation, Act of Installing.**—*See* Electric Lighting.

**Instantaneous Dissolving.**—Although somewhat extravagant in the use of gas, the effect is most pleasing, and is easily accomplished by having a fan to swivel between the objectives of the bi-unial, so that when one lens is covered the other is open. The lights must be kept going in both lanterns; therefore, instead of a gradual fading away and coming into view of the pictures, the fan is raised or lowered as the case may be, when the picture is momentarily changed.

**Instantaneous Photography.**—This should be taken in a comparative sense, and understood to imply a very short exposure; so short indeed are some, that the five hundredth part of a second may be set down as no exaggeration.

**Insulation.**—The means of supporting an electrified body, or cable carrying an electric current, that the electricity be not communicated to other bodies. Any substance being a non-conductor of electricity would serve as an insulator. Amongst those most generally used, are glass, ebonite, gutta-percha, cotton soaked in oil, shellac, earthenware, etc.

**Intermediate Regulator.**—*See* Regulators.

**Iodide.**—A compound of iodine with a metal or other substance.

**Iodising Solutions for Collodion.**—To iodise plain collodion for positive pictures: alcohol 2 ounces, iodide of ammonium 50 grains, bromide of ammonium 8 grains; label "Positive Iodiser"; to each drachm add plain collodion to make up an ounce. For negative work; alcohol 2 ounces, iodide of ammonium 60 grains. Well shake up, then after standing an hour, filter and label "Negative Iodiser"; to each drachm add plain collodion to make up an ounce.

(*To be coniinned.*)

# *How Cinematographic Machines Work.*

By **MAGNET**.

MR. R. W. PAUL'S improvements in apparatus for projecting kinetoscope pictures, which form the subject matter of his patent No. 4686 of 1896, may interest the readers of this journal, as it contains many instructive points. In some of the forms of apparatus, as film is intermittently fed over rollers through the optical system of a projecting lantern, the light being cut off by an intermittently moving shutter whilst the film is in motion, Mr. Paul considers that they are imperfect in the following way, viz., they have not held the film perfectly flat and taut in advance of and in rear of the opening through which the light shines to project the picture; consequently the pictures successively projected do not accurately register with one another, and they do not lie exactly in the same plane while being projected, and further, the film is liable to curl, with the result that the effect obtained on the screen is blurred and unsteady.

The film C is provided with perforations along its edges as at *b*, and before use is preferably wound on a spool D supported in the frame B. From the spool II. the film passes over a sprocket-wheel E, the teeth *c* of which engage in the perforation *b* of the film. After passing in front of the opening *a* the film is conducted over a second sprocket-wheel F, the pins *c* of which engage in like manner with the film. The wheels E F are mounted on arbors $E^1$ $F^1$, which turn in bearings in the frame B, and which are provided at their outer ends with specially formed gear wheels *d e*; the teeth of these wheels *d* are curved at the ends *f* to correspond with the curvature of a disc G mounted on the main driving shaft J, continuous rotatory motion being given by a pulley $J^1$. The disc G is provided with teeth *g*, which are adapted to simultaneously engage in notches $f^1$ in the gear wheels *d* and *e* respectively, as in Fig. II., and this turns the wheels E F through an angle corresponding to the pitch of the consecutive pictures on the film C. When the motion is completed the wheels E F are immediately locked in position by the engagement of the periphery of the disc G with the curved surfaces *f* at the ends of the teeth of the gear wheels *g* and *e*.

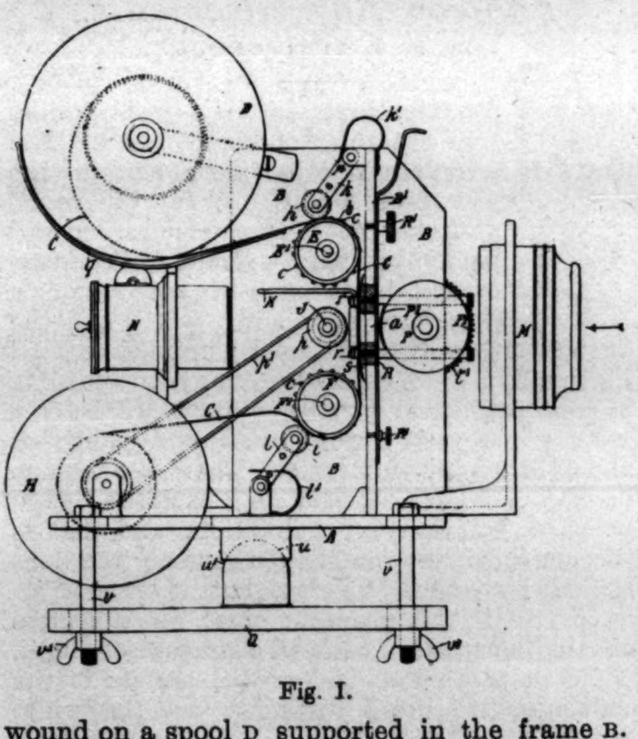


Fig. I.

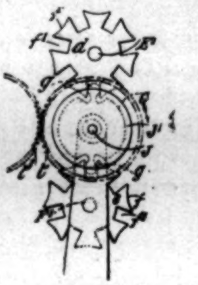


Fig. II.

In order to ensure sufficient contact of the film with the wheel E and F, guide rollers *h i* are provided. The speed of the spool D is controlled by a brake-pad mounted on a spring. By this means the tension of the film is regulated and over-running of the spool prevented. Other pads press against either side of the picture arranged round the window *a*, and hold it in a constant position relative to the optical system of the lantern. The continuously rotating shutter P consists of two segments of a cylinder $P^1$ (No. 4686 of 1896).

Mr. H. W. Short obtains an intermittent motion of the film by means of a helix so arranged upon a spindle that there is an interval between the time of contact of the two ends of the helix with the teeth upon a toothed wheel.

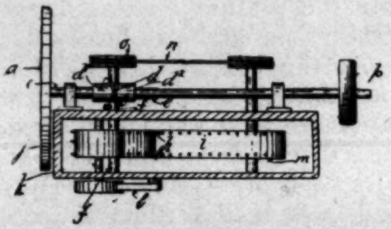


Fig. III.

In Fig. III., *d* is the helix, *e* the toothed wheel which lies underneath the helix shaft and is almost hidden, *a* the rotary disc, *i* the strip of film, *j* a shutter spool controlled by a brake *l* (No. 3777 of 1896).

Professor W. Latham, of New York, has found that pictures of moving objects can be successfully projected only by the use of a high power, and that an electric arc is best suited for the purpose. In order to produce the effect of continuous motion the pictures must succeed each other with great rapidity, and the duration of exposure must be so slight that the most intense light must be used in order to secure the quantity of light in the space of time permitted to produce the demarcation between light and shadow. The accompanying Fig. IV. shows the general arrangement. Absolute centrality of the optical system is provided for by having all the adjustable lenses and their longitudinally sliding parts mounted upon guiding rods, 7. The lamp $10^a$ slides in the tube 13 for adjustment of the light relatively to the condensing lens 11. Stray light is prevented from escaping by the bellows 14. The numerals 19, 19 indicate the supports for the picture bearing strips and the shutter mechanism and are firmly fixed to the bench, 6. At the bottom is a spool, 37, which delivers the film to be passed in front of the exposure aperture to the spool 36 above. These spools, being driven by a band and pulley, are regulated by a friction device. By means of gearing and rollers the film is properly conducted and guided across the optical axis of the apparatus. The supporting frame 19, 19 is provided with an opening in the line of the optical axis, and the disc or shutter, 4, is so placed that as it revolves the centre of its slot cuts the optical axis, and its rate of revolution is such that whenever the centre of a picture of a travelling film reaches the optical axis, the centre of the slot in the disc comes in the same line. The speed imparted by the motion to the main driving shaft is controlled by a fractional roller, 59, which is adjusted towards or away from the centre of the friction plate, thus diminishing or increasing the rate of the friction plate shaft. As a means of automatically regulating the revolution of the receiving wheel, 36, there is employed an idler, 47, which is preferably journalled to the frame, 19, 19, and is provided with a slot 48, which is adjustably fixed to the roller 49. Around this roller is passed the belt, 33, as shown. By adjusting the roller 49 inward or outward the pressure on the belt is varied. As the receiving reel gets larger by the accumulated film, the idler 47 automatically rises and loosens the belt, causing it to slip slightly on the reel pulley 32. As a means of more nicely adjusting the pressure exerted by the idler, the outer end of the latter is screw-threaded and provided with the weight 50. The idler and the friction means applied to the top reel co-operate to give better results than either would give alone, though either of the devices may be used to the exclusion of the other (No. 4841 of 1896).

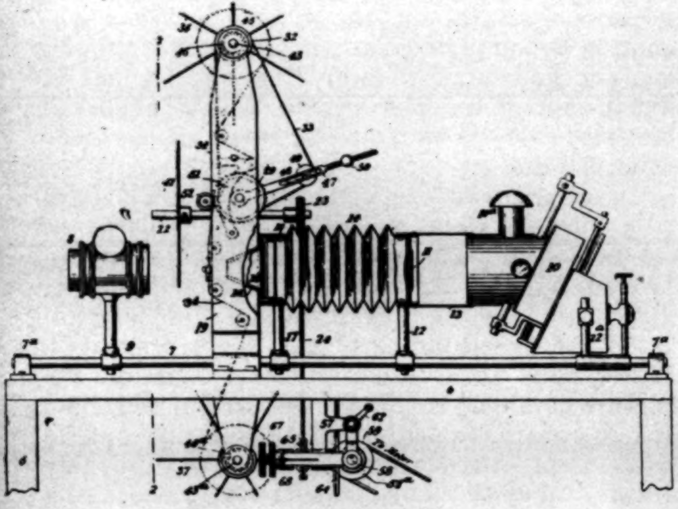


Fig. IV.

(*To be continued.*)

* * *

## *Lantern Advertisements.*

**By F. J. SCRIMGEOUR.**

As a rule, November finds the lanternist in the thick of engagements. The lantern will be, just now, in the best of conditions; for the result of the first and chief cleaning will be as yet very evident. Furniture cream, brass polish, and chamois leather, have each had a turn, and the dusters are away at the wash; quite time, too! Personally, I do not think one such cleaning is nearly sufficient for the winter's work; my own triple gets a good dust and polish at about fortnightly intervals. There is one part, however, which should be examined and polished before every exhibition, and that is the condensing system. Of course the lens should be looked to also, but it is not so important in this respect; dust on the glass of the lens only causes decrease of light, while each grain of dust on the surface of the condenser is shown distinctly on the white screen.

Another thing that must also be borne in mind before each entertainment is the advertisement. This is almost as important as a clean condenser, perhaps more so! For unless there is a good audience, even polished glass and clean linen won't make a successful show. There are few things connected with lanternism which give such a latitude in choice as the advertisement; of lenses and of lanterns there are many types, but in the choice of the form which the advertisement is to take, there is room for even more individual taste. And then the advertisement lends itself far easier to variety than any other detail—it entirely differs from any section of our apparatus; for while, in a notice, some variety is in certain cases advisable, continual change in regulators and such appliances deserves to be heartily condemned. There are various ways of bringing a lantern lecture or exhibition before the notice of the public; each specially applicable to circumstances depending upon the nature of the meeting, the vicinity, the hall or church, and the class of audience. Unless you desire to gain the reputation of "drawing" under false pretences, the notice or advertisement must be carefully tempered to the nature of the meeting.

The lecture should be announced *as a lecture*; the exhibition *as an exhibition*. Both you and I know of instances where the pulpit intimation has emphasised the fact that the

**special meeting**

in the coming week would "consist simply of an exhibition of pretty views, without any attempt at elaborate description," and then each slide has been but a convenient peg on which to hang a ten minutes' edification. Both you and I have seen disgusted adults endeavouring to keep themselves awake by censuring Tommy for making "horses" of his feet, and clutching at Jenny whenever a "dose" tended towards a fall forwards against the bookboard. Whether the minister, or whoever it is, errs most when he is giving intimation, or when he is describing the views, it is difficult to say. On the next occasion he should take care that the promise and the realisation have a fair resemblance; this may be done by altering either the one or the other. Mistakes such as the above are causing the lantern to lose some of its popularity in certain districts. And no wonder!

If tea does not possess its advertised qualities, does it increase in popular favour? The people expect what is announced. If they don't get that, if they have been continually disappointed, their confidence in pulpit and newspaper announcements is shaken, and lanternism in the district gets a shock from which it may take long to recover. There are towns where the effect of years of broken promises is that now the optical lantern has fallen into disrepute and is by this time anything but an attraction. This is a pity; but can it be wondered at? On the other hand, the reputation of giving the public what they came for is a standing advertisement which will assure an audience on the smallest notice. I know a hall where a newspaper or bill advertisement is absolutely unnecessary, and a mere mention at one of the weekly meetings will fill every seat. The people in the district round that hall have every reason for their confidence; they know that they will see or hear exactly what they have been led to believe they will see or hear. And so I think it is clear that a lecture should be advertised as a lecture. The wording is important. In a series of lectures—monthly lectures, etc.—the main portion of the notice should remain the same throughout the session. Something like the following is sufficient, and has a "concrete" look and sincere air, which is most advisable to gain the sort of audience desired:—

____________________ HALL MONTHLY LECTURES.

THE

FOURTH LECTURE OF THE SERIES

WILL BE DELIVERED ON

WEDNESDAY, THE 6TH OF DECEMBER,

At 8 p.m.,

By JOHN JONES, Esq.

Subject ... ... "A Whaling Voyage."

DESCRIPTIVE VIEWS BY LIMELIGHT.

Lanternist... ... Mr. J. Robertson.

*Admission* ____________________

There are a few points to be noted regarding the above model. Variety in the heading is not desirable. In a single winter's series much the same audience is to be expected, and a familiar headline will at once catch the eye and command attention. There are secretaries who seem to glory in having throughout the session no two headings alike—"A Whaling Voyage," "John Jones, Esq., will lecture," "Limelight Views," "To-morrow night." With headings such as these originality may be gained, but such variety should be kept for more opportune occasions.

Secondly: Give the year—1897—if you so desire, or think it needful. The printer, on one occasion last winter, advertised my entertainment for an evening in the year 1997, Anno Domini! Will my unavoidable absence from the country require a letter of apology?

Thirdly: I give the time as "8 p.m." There *are* gentlemen who prefer "8 o'clock prompt." In some cases this is justifiable, often necessary, by the memory of former meetings. That this should be so is unfortunate, and it would be good for all if, in the future, promptness was made so certain that a public notice to that effect would not be required. Oh, the delicate, subtle insinuation possible to be gathered from "8 o'clock prompt"!

Fourthly: I have mentioned the lanternist by name. This is very seldom done in any part—town or country—but I think such mention is but right. For the operator has his responsibilities, and, moreover, hard work, which surely deserve public recognition; but, besides, is it not possible that the expected audience may have some interest in knowing who is to have charge of what is popularly, and *rightly*, considered the most dangerous part of the evening's meeting? I know, as a fact, some districts where the choice of lanternist has a distinct effect upon the size of the audience. There is nothing to wonder at in this. Operators who invariably make their duty a complete success are by no means common. Therefore, if a man has been secured whom the public know by reputation to be thoroughly up to his work, the fact should be included in the press notice. Posters advertising lectures should also be characterised by plainness and simplicity. Keep your exclamation marks for exhibitions and entertainments; commas and full stops are enough for the other notices. It might call forth sarcastic remarks to urge the people "Come in your thousands!" when Professor Oldun is to tell all he knows of the "Egyptian Papyri of the 18th Dynasty."

(*To be continued.*)

## *The Finishing of Photographic Enlargements.*

**By EDGAR CLIFTON.**

LITTLE has been written upon the finishing by more or less elaborate hand-work of enlarged photographs, and what literature does exist upon the subject consists mainly of instruction in drawing, usually with special reference to the head and bust vignettes, which are the sheet anchor of the professional portraitist. The amateur with fair artistic taste, but with little or no knowledge of the technics of draughtsmanship, seeks in vain for some elementary instruction in the art of improving his already nearly perfect enlargements, and removing defects which were not obtrusive in the original negative, but which become painfully apparent in the enlarged copy, and it will be the endeavour of the writer to show how the maximum of effect may be produced with the minimum of trouble and skill.

Bromide prints lend themselves so perfectly to finishing by almost any method, that it is fortunate that the production of the plain enlargement is so simple, and that the results are, comparatively speaking, permanent. Oil or water colours, or chalk, may be used alone or in conjunction with each other, according to the work which has to be done, and to the personal preference of the worker. As there seems to be a general idea that chalk or crayon is the easiest medium for a beginner to adopt, we will start with the idea that a bromide enlargement of an

### ordinary character

has been properly mounted upon a stout cardboard, and that none of the starch or other mounting medium has been allowed to remain upon the surface.

The materials required are few and inexpensive. A stick of "stumping sauce" (a very soft black crayon, usually sold in a glass tube), two or three black *conté* crayons of various degrees of hardness, a white crayon, a chalk pencil, of medium hardness, in cedar, a couple of leather stumps (one fairly large and one smaller), a bundle of small paper stumps, and a bit of wash-leather glued upon a piece of wood or card to serve as a palette for the stumping sauce, complete the outfit; the cost of which is only about half-a-crown. A couple of crayon holders may also be added for a few pence extra, and will be found convenient. We shall also require two pieces of very fine wash-leather; one of these is to be glued upon a flat piece of wood or stout card to form a palette, and the other will be used to spread large tints. The lid of a small cardboard plate box, ¼-plate or lantern size, may be requisitioned to serve as a receptacle for the stumping chalk actually in use.

Now to begin, the end of the stick of stumping chalk should be rubbed upon the inside of the box lid until a sufficient quantity has been reduced to powder. If any lumps crumble off the stick they should be carefully powdered, or their presence would give much trouble later on. A little chalk must also be rubbed upon one corner of the leather palette, and from this corner by means of another bit of leather, or even rag, it should be graduated over the surface of the palette until the further corner has a mere tint of grey upon it.

The enlargement being placed upon an easel or other suitable support should now receive a first general tint, which is applied by means of the soft piece of wash-leather already mentioned. This should be spread over the first two fingers of the right hand and dipped in the powdered crayon in the box lid; it must next be rubbed upon a piece of waste paper to equalise it and to ascertain the depth of tint, which must be very slight; when this is correct, the tint must be applied to the enlargement by gently rubbing the leather with a circular motion, replenishing with chalk from time to time as may be necessary. It is advisable to commence this process upon the darker parts of the picture, and to cover the face when the leather has parted with nearly all its chalk. It may here be stated that the object of this tint is not only to give softness of effect, but also to ensure that no part of the original remains uncovered, as it is exceedingly improbable that the tone of the enlargement will exactly match the chalk, and any untouched parts would be either warmer or colder in tint.

If this rubbing-in process be skilfully performed, a good deal of strength may be worked into the clothes and hair of a figure or into the shadows of a view, before the stumps or crayons are called into use, but the novice had best be content with attempting little in this direction, trusting more to the larger stumps which he will now bring into action.

(*To be continued.*)

* * *

## *Keevil's Lantern.*

### By A BIDEFORDIAN.

THE following particulars and sketches of an old pattern of dissolving view lantern with one illuminant only, I think must be the form of lantern alluded to by Mr. J. J. S. Bird in the December number for 1896. The details are mostly as published by the makers (F. York and Son) about twenty years ago.

“This unique invention produces the effects of dissolving views with one light and one lantern; it is fitted with 4-inch condensers, the front lens (A) is the ordinary double combination, and the side (B) a prismatic lens of the same focus and brilliancy, which directs the rays at right angles coinciding with the front. Dissolving and other effects are produced (C) with the greatest ease and certainty, the light being of the same brilliancy. It may be used as a single lantern by removing the side condenser and dissolving arrangement. The jet is the blow-through form, consuming 2 feet of oxygen an hour. Its great recommendations are easy manipulation, cheapness, and economy of space, the whole packing into a box 14 by 12 and 8 inches deep, being the most portable bi-unial ever made. This lantern fits into one of Young's generators, which requires no stand, gas-bag, pressure board, retort, or purifier; forming a convenient package about the size of an ordinary portmanteau. The only additional things required for a lecturer's complete outfit are a screen, limes, india-rubber tubing, and the pictures, which require no frames.”

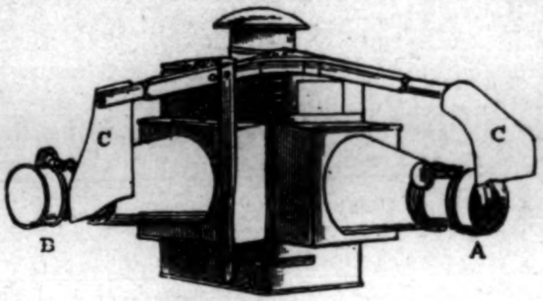


Fig. I.

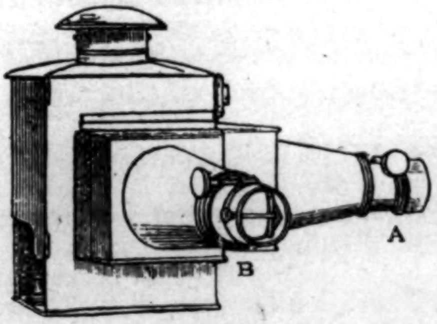


Fig. II.

REFERENCE FIGS. 1 AND 2:

A—Double achromatic combination for direct light.
B—Prismatic lens combination to cover the same circle.
C—Dissolvers.

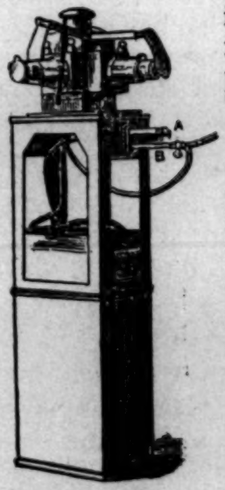


Fig. III.

With regard to the gasometer, the oxygen gas is made by inserting a tin or cake containing oxygen mixture into the generator (A), which is heated by a Bunsen burner (B), producing a foot of gas in about five minutes; 14 pounds weight is placed on the gasometer, which with the water produces a pressure equal to 112 pounds on the usual gas-bag. Fig. 3 shows the Keevil lantern and gas apparatus, which can be managed by one person. The size of the gasometer when packed and containing the lantern, slides, tubing, generator, receiver, limes, oxygen mixture, etc., etc., is 14 by 10 by 23 inches, and weighs about 30 pounds.

## *The Composition, Temperature, and Brilliancy of Flames.*

**From L'ALCOOL ET LE SUCRE.**

A FLAME is produced by a gas in a state of combustion, and it may be more or less hot, and more or less luminous, according to the nature of the gas by which it is engendered. It has a particular colour, which depends upon the species of the ignited substances, or of those projected into its interior during combustion. When produced by a compound substance it is not homogeneous, and becomes the seat of very complex chemical phenomena; some parts are bluish, others yellowish white, and sometimes yellow, greenish, greyish, or cloudy. Transitory reactions then take place before the final evolution of carbonic acid and water steam. Thus, in the case of hydrocarbides, highly carburetted compounds are formed, like acetylene, free carbon, hydrogen, water steam, oxide of carbon, carbonic acid from the commencement of combustion, which, besides, is more or less complete.

Hydrogen gas—very combustible—burns first, and the liberated carbon is then brought to incandescence by the heat evolved in formation of water. It is the presence of carbon which gives **brilliancy to the flame—** brilliancy which can be farther increased by the introduction of solid substances, such as oxide of zinc, magnesium, and some rare metals, which in the state of incandescence are very brilliant. A similar phenomenon can be obtained with a platinum wire, bits of asbestos, quicklime, etc. Finally, increase of temperature by aid of hot gases or heating the aspired air are also means to increase the brilliancy of flames.

Frankland admits that incandescent carbon is not indispensable for brilliancy. He bases his opinion on the fact that pure hydrogen burns brightly in oxygen under a pressure of ten atmospheres, producing a continuous spectrum. He also observed that the flame of alcohol under pressure is not only luminous, but also fuliginous. However, the deposit of smoke-black on an object placed in the flame of carburetted substances, and also the sudden brilliancy of the alcohol flame into which one introduces a substance capable of causing a deposit of carbon, like chlorine, demonstrate without doubt that lighting is due to the presence of carbon.

It has been explained that pressure in the case of hydrogen probably causes a decrease in the volume of flame, and raises the temperature so as to cause luminosity. But for alcohol this explanation is not plausible, and some other cause for the phenomenon must be found. In the mercury eudiometer the two gases, hydrogen and oxygen, mixed in the proportion of 2 vols. of the first and 1 of the second, give 2 vols. of water steam in ordinary atmospheric conditions after passage of the electric spark. It may be admitted that the same volumes **under pressure** of 10 atmospheres will cause the same chemical reaction, but with less sharp combustion, for the water steam formed, although occupying as it is gradually produced a volume one-third less than the total volume of the gases which have engendered it, is none the less at a high pressure which forces the steam to remain in a vesicular state of composition and decomposition in the midst of the flame as long as combustion lasts; the phenomenon then occurs as though a solid substance, water steam or oxide of a very volatile metal, were raised to incandescence in a hydrogen flame.

In the case of alcohol a similar phenomenon should be produced with the water steam formed, and also the carbonic acid under pressure according as formed, tends to decrease the combustive activity of the oxygen or hydrogen, so that the latter does not, in slow combustion with loss of exterior heat, supply sufficient heat to bring all the free carbon to the point of incandescence, thus the flame is dusky. It is also probable that oxide of carbon is formed with the carbonic acid, either on account of incomplete combustion, or of transformation of the latter into oxide of carbon on contact with the carbon at red heat. This oxide at a high temperature is in turn decomposed, giving carbon and carbonic acid.

However it may be with these explanations, the main point is to obtain a maximum luminosity with any combustible substance in the conditions of temperature and atmospheric pressure. For this it should have a chemical composition capable of giving complete combustion in the air. Once this point attained by the direct or indirect methods about to be given for various combustibles, it will be wise to have recourse to the physico-mechanical agents generally employed to increase brilliancy of flames, viz.,—forced draught, heating of the air, incandescent burners, regenerative, etc. Many lamps actually recommended for combustion of alcohol are furnished with a small

### incandescent mantle

similar to that of the Auer burner, which has been so successful in gas-lighting. This mantle, formed of certain oxides of rare metals, becomes exceedingly luminous at a high temperature.

The best type of alcohol lamp should then not only have an incandescent burner which gives a saving of 25 per cent. compared with gas, but should also utilise the heat of combustion to heat the air supplied as with incandescent and regenerative burners of the Denayrouze type, which only consume about half a cubic foot of gas per hour, whereas the old burner consumes 4½ feet, and the Auer burner a little over 1 foot.

The real heating power of a combustible substance is the quantity of heat it can evolve in complete combustion of its elements. In the case of hydrocarbides it is the sum of the quantities of heat from the transformation of all the atoms of hydrogen and carbon under the influence of oxygen into water steam and carbonic acid. In the case of certain substances the calorific power does not always manifest itself entirely in ordinary conditions of temperature and atmospheric pressure, and it is requisite to heighten, so to speak, the combination of oxygen by special methods in order to obtain complete combustion of hydrogen and carbon. The nature of the elements of combustion has then great influence on the heat evolved by the substance, and consequently on its calorific power; likewise the relative proportions of hydrogen and carbon exert an action determinant of the complete combustion in the air without any other aid.

The real lighting power of a substance is the quantity of luminous heat which it can emit in complete combustion, and is the consequence of the manifestation of chemical energy or real calorific power in sharp combustion. As for this last, in ordinary air it is sometimes requisite to have recourse to forced combustion in order to obtain its full power.

The chemical composition, both from the point of view of nature and proportion of combustible elements, exerts then a prepondering influence on the amount of luminous heat supplied by the substance in ordinary conditions of temperature and pressure. Hydrogen, an eminently combustible gas, is a substance which evolves much heat in burning, but the flame in ordinary air is very pale. According to the experiments of Favre and Silbermann, 1 gramme of hydrogen gives in combustion in oxygen 34·462 C., but by virtue of the reaction

$$H^2+O=H^2O$$
$$34{\cdot}462\times2=68{\cdot}924\text{ C.},$$

we have 2 grammes of hydrogen, which combining with 16 grains of oxygen produce 19 grains of water with a temperature of 68·924 C.

The same experimenters also determined the heat evolved by different simple and compound substances, many of which are mentioned in the following table. Berthelot, by scientific methods, fixed approximately the combustive heat of gaseous carbon at 96·5 C., a figure markedly like 96·6, which is that for charcoal, and 96·924, sum of the quantities of heat evolved for transformation; firstly of carbon into oxide of carbon, then of this last into carbonic acid.

| Substance at ordinary temperature. | Product brought to ordinary temperature. | Heat evolved. Per gramme of substance. | Heat evolved. Per weight represented by formula H=1 gramme. | |
|---|---|---|---|---|
| $H^2$ | $H^2O$ | 34·462C | 68·924C | |
| C. Charcoal | $CO^2$ | 8·08 | 96·96 | |
| CO | $CO^2$ | 2·403 | 62·284 | 96·924 |
| C | CO | 2·47 | 29·64 | |
| Reduction into carbonic anhydride and water. | | | | |
| Marsh Gas | $CH^4$ | 13·063 | 209·008 | |
| Ethylene | $C^2H^4$ | 11·858 | 332·024 | |
| Amylene | $C^5H^{10}$ | 11·491 | 804·37 | |
| Ether | $C^4H^{10}O$ | 9·028 | 668·072 | |
| Wood spirit | $CH^4O$ | 5·307 | 169·824 | |
| Ethyl alcohol | $C^2H^6O$ | 7·184 | 330·464 | |
| Amyl alcohol | $C^5H^{12}O$ | 8·959 | 788·392 | |
| Acetone | $C^3H^6O$ | 7·303 | 394·362 | |

Marsh gas, according to the chemical formulæ and the atomic weights of its elements should evolve

$$\begin{array}{rcl} C & = & 96{\cdot}5 \\ H^4 & = & 137{\cdot}844 \\ \hline & & 234{\cdot}344\text{ C} \end{array}$$

The same calculation applied to a number of other compounds gives figures which seem of a like class, but also differ greatly from experiment.

Experiment
Ethylene ......$C^2H^4$ : 193 +137·844=330·844..332 024
Amylene ......$C^5H^{10}$ : 482·5+344·62 =827·12 ..804·37
Ether ......$C^4H^{10}O$ : 386 +344·62 =730·62 ..668·072
Wood spirit .. $CH^4O$ : 96·5 +137·844=234·344..169·824
Ethyl alcohol $C^2H^6O$ : 193 +206·772=399·772..330 464
Amyl alcohol $C^5H^{12}O$ . 482·5+413·544=906·044..788·392
Acetone ......$C^3H^6O$ : 289·5+206·772=496·272..394·362

These differences are due to the fact that the real combustive heat of carbon is not known. —*L'Alcool et le Sucre.*

## *Are Ether Saturators Dangerous?*

By THOMAS J. SMITH.

NOT infrequently it happens that when some new machinery or apparatus is working its way into favour, an accident occurs, driving away the would-be users like a flock of frightened sheep. There may not have been a defect in the mechanism, the cause may have been solely carelessness or ignorance on the part of the person in charge; but, for a time, neither statements of facts nor arguments based on mechanics or chemistry, however simply put, will remove the almost blind distrust, nor allay the fears of the public.

Such may easily be the case this winter, after the terrible disaster in which an ether saturator figured at the Paris bazaar.

Most of the readers of the OPTICAL MAGIC LANTERN JOURNAL must be practical lanternists, with more or less experience, but discussions show now and again that there are still many who regard even modern saturators as liable to be dangerous at any time, however well managed. Seeing that only makers and users can give opinions of any real worth, I offer a few facts and ideas based on some years' experience with different saturators, stating at once that I have no interest whatever in, or prejudice against, any such apparatus beyond that of purchasing the best article obtainable from time to time for my own use in optical projection.

To begin, a saturator is simply a metal vessel packed with asbestos, sponge, flannel, or other porous substance, which will absorb liquid ether or gasoline, which is given off in vapour by heating, or passing a small current of oxygen through it, and this driven to the jet, burns exactly like coal gas at the nipple. A direct stream of oxygen from the cylinder is then mixed with this, and produces results similar to gases taken from two cylinders.

With improper use, both are dangerous, more or less; but in capable hands both are absolutely safe. So long as there is sufficient vaporised ether, and sufficient power to drive it to the jet and keep the flame burning at the nipple only, there is no danger. I say vaporised ether, for if liquid ether gets along the tubes there is an element of danger, but this cannot occur with proper filling and time for saturation, and is of no moment whatever in some apparatus. The risk to be avoided as a general principle, no matter what apparatus is used, is exhaustion of ether. Just as a certain proportion of coal gas in a room will cause an explosion if brought into contact with flame, so as ether is driven out, the proportion of oxygen in the saturator increases, ultimately making an explosive mixture there. Under ordinary circumstances, and especially in one or two saturators and jets combined, this constitutes

**no danger whatever,**

it being impossible for a flame to pass from the jet down to the gases; and in other kinds, generally speaking, the volume of gas is so small, and the apparatus so strong, that there is no danger.

So much for emptying; now as regards filling. This may be done after dark if necessary, in any ordinary room, with the gas or candle light say 3 feet or more away and above for safety, and not near the fire. I have frequently had it to do under very differing conditions, but always like to be over safe, as ether is very volatile and inflammable. Pure ether is not necessary, and is besides expensive, while methylated ether ·720 to ·750 is best for the purpose.

Filling should never be attempted, as I understand it has been, with the light still burning at the jet or with a candle burning close to the apparatus.

The question of capacity is important. On the one hand, a saturator should be of such size and the jet of such bore as to last 2½ hours at full pressure, without being exhausted. But it should not be made bigger than this, except for very special purposes, as the larger it is, the greater the volume of gases when the two reach explosive point, and it might then prove what a lady once described it, when enquiring, "a shatterator."

There are on the market two types of apparatus, viz., one comprising a complete apparatus fitting inside the lantern, the other being saturators simply, and connected like cyclinders up to the jet which may be of any good make, though special jets for ether are best. Each has its advantages and disadvantages, but this rule may be taken as a general test, that it ought to be possible to recharge any saturator till it overflows, and then drain it a few seconds, without any calculation as to how much was left in from last time, and that when so filled and left to saturate, preferably two or three hours before using, the light should be absolutely free from flicker. I am well acquainted with four different types that are all deservedly popular (the Scott, Lawson, Gridiron, and Pendant), and while each one has disadvantages, it might not be judicious to state them in this article, though I could point them out. Their advantages, perhaps no one will object to my stating, as a result of actual experience.

No. 1.—The Scott is good, especially with the jet by the same maker.

No. 2.—The Lawson is absolutely safe and simple in its later forms.

No. 3.—The Gridiron works well, and is an ornament to any lantern.

No. 4.—The Pendant is easily filled, and with the Gwyer jet, very effective, there being no flicker with this saturator, but the excellent principle in this combination is certainly worthy better workmanship.

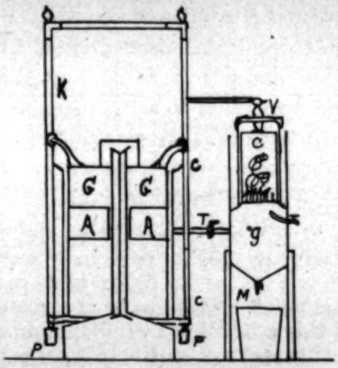
Finally, there is still room, at the top, for a good saturator and jet; of good principle, reasonable capacity, and with working parts especially well finished, always keeping in view the necessary qualification of absolute safety; and while these remarks may not cause any improvement in such apparatus to be attempted, I feel they will not be useless if some brother lanternist is induced to try ether with some knowledge of what he is doing.

—:o:—

## NEW APPARATUS.

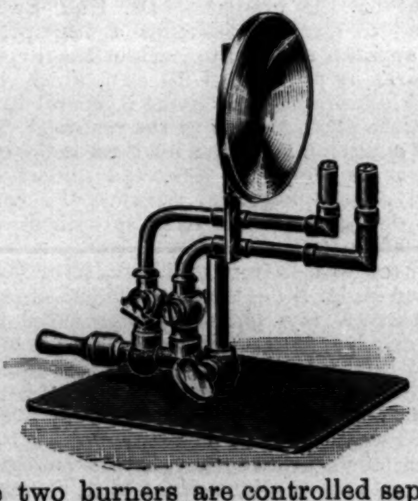
### ACETYLENE APPARATUS WITH VARIABLE LEVEL.

This new type of generator consists, essentially, of a gas-holder (G) with moveable bell and a generator (G), a simple sheet-iron cylinder widened at the base and communicating with the tank by a pipe (T). It is covered with an iron lid furnished with winged nuts and surmounted by a tap with two outlets (V) through which the gas passes into the holder *via* pipes (CC). The calcium carbide is placed in a bell basket with a bottom of wide openwork, and secured by catches at the top part of the generator cylinder. The double tap (V) places the generator in communication either with the outer air or gas-holder. In such circumstances the apparatus is set in work as follows:—The tank of the gas-holder is filled with water and the carbide basket is placed in the generator. The lid is secured, and tap (V) turned towards the outer air. Tap (T) is opened and the excess of water flows from the tank, driving away the air until the water level reaches the carbide. Evolution of gas now begins, and tap (V) is turned so to guide the gas into the bell. Automatism of the apparatus is obtained as follows:—Below the roof of the bell is a sheet-iron compartment (A) intended to produce a displacement of level as it rises or falls in the water. It will thus cause at (G) a rise or fall of level which will act at (*g*) so as to cause or break contact with the carbide, and thus regulate the production of gas. This apparatus, which is of French origin, may be recharged whilst in full working.



### ACETYLENE GAS JET.

In last issue we stated that Mr. F. Brown, of 13, Gate Street, W.C., had purchased the Moss acetylene jet, and now we are enabled to give an illustration of same. It will be seen that the two burners are controlled separately from behind. The reflector has means for controlling its proper adjustment both horizontal and vertical.



# *The Rontgen Rays.*

## DEMONSTRATION IN COVENTRY.

DR. HALL EDWARDS, of Birmingham, who was one of the earliest in this country to investigate the power of the X rays, gave a practical demonstration in Coventry a few weeks ago. The occasion was the opening of the Coventry and Midland Photographic Society, and the meeting was made a public one.

The lecturer commenced with an expression of pleasure at being able to chat with his audience on what he described as one of the most wonderful discoveries of the century. The subject was not purely a photographic one, although he was there to lecture to a Photographic Society, but was only so indirectly. It was more an electrical matter than photographic, but in its science it was either. Dr. Hall Edwards continued to explain the term "matter" as being scientifically something which had weight. So far back as 1816 there had been predicted a matter which would be as different as gas from liquid and liquid from solid. This has been termed radiant matter, and from this a new form of phenomena would come. This was not realised until 1874, when Professor Crookes discovered it. The lecturer next demonstrated the effect of electricity passing through a Crooke's tube, and showed some pretty coloured effects by the use of different kinds of glass. From the discovery by Crookes there were great possibilities, and X rays, the first possibility of radiant matter, were, he thought, as a mere child to what would be done in time to come, the lecturer incidently mentioning the possibilities in the way of propulsion. Dr. Hall Edwards continued to trace the progress of knowledge in the matter, until he came to Professor Rontgen's wonderful discovery, and in regard to this the lecturer said he had experimented with some thousands of substances, and there was not one that the rays could not go through. It would go through anything and everything. The ray was not a light ray, and there had been many theories as to what it was, and they would have to rest contented without the proof for the present. Dr. Hall Edwards next proceeded to give his audience a description of the various apparati required to produce the ray, illustrating his remarks by pointing to his own, which were before him, and following this by giving a general invitation to anyone to be photographed by the process. The Mayor at once volunteered to have his hand radiographed, and the lecturer quickly did this, and almost as quickly produced a good negative, showing the bones of the hand, a ring, and several hard substances which had been placed under the hand.

By the aid of a lantern manipulated by Messrs. A. B. Clarke and E. M. Iliffe, the lecturer had thrown on the screen many X rays photographs produced by himself. These included purses with the gold inside thrown distinctly into prominence; side by side came a picture of an ordinary exterior photograph, and an X ray interior of various objects. This was followed by a hand, round which was wound various pieces of wire; a Lee-Metford bullet; a lady's foot showing, as the lecturer said, the effect of getting an eight-size foot in a two boot, and various other photographs of scientific interest. There were also several humorous sketches by the lecturer, based upon the absurd fallacies which got abroad on the discovery of X rays being made.

# PATENT INTELLIGENCE.

*The following List, relating to current Patent Applications, is compiled expressly for the "Optical Magic Lantern Journal" by W. P. Thompson & Co., Patent Agents, of 322, High Holborn, London, W.C., to whom all enquiries for further information should be addressed.*

| No. | RECENT PATENT APPLICATIONS. |
|---|---|
| 21094. | 14th September, 1897. G. B. Ellis (N. Lepage and L. M. Maisonnier, France). Improvements in apparatus for producing acetylene gas. |
| 21262. | 16th September, 1897. A. Lewino. A new or improved toy for producing optical illusions. |
| 21263. | 16th September, 1897. A. Lewino. An improved apparatus for displaying consecutive figures or pictures of moving objects. |
| 21408. | 18th September, 1897. H. Morrison. A new or improved kinematograph. |
| 21464. | 18th September, 1897. J. Windmüller. An improved device for producing and burning acetylene gas. |
| 21480. | 18th September, 1897. W. Symons. Improved movable devices for producing optical illusion changes (transparencies). |
| 21516. | 20th September, 1897. M. Stern. Improvements in the mode and means of apparatus connected with the cinematograph, or other apparatus for showing animated pictures, photographs, or other pictures. |
| 21685. | 22nd September, 1897. L. A. Franks. Improvements in jets for optical lanterns. |
| 21889. | 24th September, 1897. J. Hacking, D. Whalley, and The Ideal Gas Company, Ltd. Improved burner, especially applicable for acetylene gas, giving the only principle of perfect combustion, and free from smoke. |
| 21970. | 25th September, 1897. The British Acetylene Gas Generator Company, Ltd., and H. K. Spence. Improvements in acetylene gas lamps. |
| 22350. | 29th September, 1897. Raaul Furr. Improvements in acetylene lamps. |
| 22383. | 30th September, 1897. E. W. Porter. An improved method of exhibiting photographs applied to candle and other illuminant screens. |
| 22423. | 30th September, 1897. C. C. Nevers. Improvements in apparatus or machinery for exhibiting, taking, or printing moving or animated photographs. |
| 22489. | 1st October, 1897. A. Wrench. Improvements in flanges for carrying objectives in optical lanterns. |
| 22558. | 1st October, 1897. A. Elkan and J. Sternberg. An improved apparatus for taking and projecting chromo-photographic views. |
| 22730. | 4th October, 1897. A. Flack. Improved apparatus for producing acetylene gas. |

22747. 4th October, 1897. J. Bonn. Improvements in connection with the projection of photographs of animated subjects and methods of taking the said photographs.

22763. 5th October, 1897. A. B. Langham. Improvements in apparatus for displaying a series of representations of moving objects.

22776. 5th October, 1897. V. Hyder. A compact optical lantern outfit for acetylene gas.

22850. 5th October, 1897. W. H. Wheatley (C. W. Beck, United States). Improvements in lamps for generating and burning acetylene gas.

22929. 6th October, 1897. J. Whitehead and A. Slater. Improvements in automatic apparatus for the generation and storage of acetylene gas.

23129. 8th October, 1897. H. Howse and D. E. Hipwell. Improved apparatus for producing optical illusions.

### SPECIFICATIONS PUBLISHED.

*Copies of the following specifications may be obtained by remitting 1/- for each specification to W. P. Thompson & Co., Patent Agents, 322, High Holborn, London, W.C.*

21381 of 1896. Joly. Chromo-photographic apparatus adapted for the projection of positives upon a screen.

21382 of 1896. Joly. Chromo-photographic apparatus.

28082 of 1896. Ives. Apparatus for illuminating photochromoscope pictures.

24611 of 1896. Kay. Portable apparatus for acetylene gas.

25488 of 1896. Fournier. Acetylene gas.

30037 of 1896. De Résener. Acetylene gas.

26897 of 1896. Vaughan-Sherrin. Production of acetylene gas.

16960 of 1897. Cowan and Iles. Projection of representations of pictures upon screens.

18014 of 1897. Rateau. Chromo-photographic apparatus.

19823 of 1897. Sharp and Marsh. Acetylene production.

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## Editorial Table.

RILEY BROTHERS' CATALOGUE. — Messrs. Riley, of Bradford, have issued a new catalogue of somewhat peculiar size, 4½ by 11 inches. It contains particulars of a variety of lanterns, saturators, and other apparatus of their manufacture, together with a copious list of sets of slides.

R. H. CLARK'S CATALOGUE.—Mr. Clark, of Royston, Herts, has issued a very substantial and neatly printed catalogue, in which is set forth complete lanterns for standard size slides, from 17s. 6d. up to about £30. General fittings, colours, etc., are also illustrated. About 200 pages are occupied with lists of various subjects, for which slides are kept in stock.

"COMMERCIAL USES OF COAL GAS." — Warrington, Manchester and London: Fletcher Russell and Co., Ltd. —This book is intended by the author, Thomas Fletcher, F.C.S., as a supplement to his previous book on "Coal Gas as a Fuel." Numerous gas appliances are illustrated to show their adaptability for various trade uses, including bacon drying, cigar conditioning, muffle furnaces, etc., etc.

"CHEMISTRY FOR PHOTOGRAPHERS," 1s. London: Dawbarn & Ward.—Mr. Ch. F. Townsend, F.C.S., F.R.P.S., deals in an interesting way with such subjects as chemistry of the photographic image, developers, reversal, reduction, printing in silver, salts of iron, platinum and bichromate, recovery of residues, etc. Photographers will find this an excellent reference book.

LANTERNISTS' POCKET BOOK.—A neat pocket book containing table and other information for lanternists has been issued by Messrs. Butcher and Son, of Blackheath. These can be obtained from most dealers in apparatus, free of charge.

E. G. WOOD'S CATALOGUE.—Mr. Wood, of 74, Cheapside, has issued a new supplementary catalogue of slides in which is included the following sets of slides;—Life and times of Queen Victoria; Growth of the Queen's dominions; Victorian Era; Diamond Jubilee procession and illuminations; Calcutta to Burmah; Coast of India; Siam to Borneo; A trip to Paris; and many other interesting sets.

T. T. WING'S SLIDES.—Mr. Wing, of Chatteris, Cambs., has sent us samples of slides made and coloured by him. The plain slides are very clear, of good and pleasing tone, and the colouring is carefully executed. Mr. Wing does a big business both with the trade and with private customers in connection with preparing and colouring slides. Mr. Wing has at the present time a large quantity of secondhand slides which he is selling at very low prices.

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## Correspondence.

### ETHER SATURATORS—AN EXPLANATION WANTED.

*To the Editor.*

SIR,—I had last week an extremely unpleasant experience with an ether saturator, and I shall be glad to know if any of your readers have had a similar difficulty, and whether their explanation of the matter is similar to mine.

About half-an-hour after lighting up I found that the light jumped in a peculiar way, and I concluded that ether was being forced unevenly on to the lime cylinder. The saturator which I use is fitted with a screw valve in the front end, by which the saturated oxygen passes on to the lime. I closed this valve to its fullest extent, and yet to my astonishment I found that the light continued to burn, and that more ether was discharged every second, until the flames became so large in the lantern that they set fire to the woodwork, and it was with great difficulty that I was able to extinguish them. Fortunately, my audience took no alarm, and I was able to finish my lecture, though without showing any more pictures.

On taking the apparatus to pieces I found that ether, in a liquid state, was in the india-rubber tube connecting the cylinder with the saturator, and I am convinced that it was a case of "distilling back," than which, I imagine, one can have no more dangerous working. Had the saturator been overcharged with ether it would have become manifest at the beginning of the exhibition, and I can only account for what happened in this way:—As the lantern became hot and the heat was communicated to the saturator, the ether was vaporised rapidly, and as this vapour could not escape fast enough by the usual outlet in front, it was forced back against the pressure of oxygen from the cylinder, and in coming in contact with the cold tube outside, it was condensed into liquid, and was thence impelled up the other passage and was shot in drops on to the lime cylinder, thus producing the enlarged flames of which I spoke. My closing the front valve only increased the difficulty, because the expansion of ether continued in the chamber, and the rush back was greater than before.

I may say that I have worked a saturator now for a considerable time, and on almost every occasion with great satisfaction, but this alarming development makes me feel that it is absolutely unfair to an audience to use an apparatus which is liable to such dangerous developments, and which might at any moment cause a disaster equal in horror to that which took place at the Paris bazaar.

I am communicating my experience to the makers of this saturator, but I think it only right to warn my fellow lanternists of what appears to me to be an unknown peril.

I am, Sir,
Yours faithfully,
A. DOWNES-SHAW.

14th October, 1897.

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## Notes and Queries.

*L. B. Allingham.*—You will find a great difficulty in obtaining a cinematograph and films for same on hire, unless you consent for the firm to also send an operator. Several pounds worth of damage can be done to films in a few minutes by inexperienced hands.

*Rev.* ——.—(1) A silvered screen can be obtained through any lantern dealer, or direct from Field and Co., 142, Suffolk Street, Birmingham. (2). The sheeting spoken of can be rendered more opaque by means of a coating of whitewash.

*A. B. C.* — You will find illustrated particulars of aphengescopes in this journal for January, 1890, and November, 1892.

*H. Nash.*—With a satisfactory jet there is little or no difference in the intensity of light between mixed jet with oxygen and hydrogen, and oxygen and ether. Still, if you can obtain both gases easily, you will probably prefer the working of the former.

*F. W. Cooper.*—Replied by post, and also returned the "make up" of book.

*Ion* writes:—Can you or any of your numerous readers give an explanation of the introductory slide in set "Trial of Sir Jasper—the Golden Mean of Temperance"? There is no reference to this slide in the poem by Mr. Hall. *Ans.*—Many introductory slides are left with the artist who illustrates the set, and have nothing to do with the reading. We are not acquainted, however, with the particular slide in question, but the set is issued by Messrs. Riley, of Bradford, and perhaps they could explain matters.

*J. J. B.*—Messrs. Hill & Son, slide colourists, 33, Portsdown Road, Maida Vale.

*R. Pendlebury.*—We cannot at the moment supply you with the name of anyone in Bolton who would undertake to give you lessons in slide colouring. Perhaps a small advertisement in our columns would bring the desired information.

*A. B. C.*—(1) We think you can get wide material at any large draper's, but are afraid not under the name of Holland. Spring roller will cost a few shillings—inquire Avery and Co., Great Portland Street, W. (2) To ensure lantern and screen being at the same angle, make two narrow strips of brass, say 2 inches long, point one end, and bore a hole in the other, so that when fastened to side of lantern with a small nail it can swing freely; place another of same size on side of screen stand, and make a scale of parts of an inch near point of strip. When the strip on both lantern and screen point to the same number the apparatus will be at the correct angles. (3) We like the "to and fro" carrier. Weaken the stage springs if they are too strong, and also insert a small washer of leather on ends of spring rods. (4) The easiest way would be to have screen roller at top after the style of an ordinary blind. Roll the pull-up cord round end of roller, and when this is pulled the screen will roll up. To the end of roller a ratchet wheel can be placed—a ratchet catch will, of course, also be required; you can get such fittings from any ironmonger (Robert Shaw's patent blind ends and support) for about 6d. The screen can be lowered by simply pulling the cord away from the front, which releases the catch, then slacking off the cord.

*Jas. Steward, E. Dumont, E. A. Robins, Ralph Ashcroft, Rev. John St. John,* in our next.

*A. B. Oldham.*—We will communicate with the writer of article.

*A. Holmes.*—At 20 feet distance a lens of 8 inch focus will give a disc of 7½ feet, and at same distance a 9 inch focus will give 6¾ feet. We think for simplicity a bi-unial with the Stedman-Brown oxygen generator and blow-through jet should suit your requirements. If however you prefer oil, then two lanterns side by side.

*A. Meager.*—Your remarks *re* price of gas will find a place in next journal.

*F. J. B.*—The jet is perfectly safe under all conditions.

*G. Cooper.*—(1) Mr. Cheney has not advertised with us for the last year or so. The address at Beckenham *was* the correct one. We do not know where he has moved to, or whether he is still in business. (2) E. G. Platt, Birkbeck Road, Ridley Road, Dalston, London, N.E.

*H. Early*—(1) Saturators are stuffed with several materials, including cotton wool, flannel, hair, asbestos, etc. (2) We shall be glad to have particulars of your new apparatus when finished. (3) ANNUAL was published October 16th.